

## OBSERVATIONS ON COURTSHIP BEHAVIOR OF THE DESERT TORTOISE

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**ABSTRACT.**— Desert Tortoises (*Gopherus agassizi*) from Utah showed courtship behavior consisting of a complex series of behavioral elements.

In late July 1971, James Valade and I visited the Beaver Dam Slope west of the Beaver Dam Mountains, Washington County, Utah. This was the site of the study of the Desert Tortoise, *Gopherus agassizi*, by Woodbury and Hardy (1948).

We had the opportunity to observe courtship in a pair of tortoises from a ridge of the summer range. These observations of courtship behavior in a wild pair were compared with courtship behavior in 10 captive Desert Tortoises from Utah over a three-year period. This paper reports my observations on courtship behavior of *Gopherus agassizi* from Utah.

Weaver (1970) reports that courtship observations on *Gopherus agassizi* are numerous, but lacking in detail. Woodbury and Hardy (1948), Householder (1950), Nichols (1953, 1957), Camp (1916), Grant (1936, 1946, 1960), Eglis (1962), Ernst and Barbour (1972), Tomko (1972), and Douglass (1975) are some publications containing courtship information on *Gopherus agassizi*.

My observations indicate that Desert Tortoise courtship behavior consists of a complex series of behavioral interactions which include visual cues of head movements, apparent olfactory stimuli, attempts by the female to avoid face-to-face confrontation, and action by the male—trailing, biting, and ramming to immobilize the female, circular movements, and vocalization. These behavioral elements have been described and defined in *Gopherus* and other tortoises by Eglis (1962) and Weaver (1970).

This particular sequence of behavioral events in *Gopherus agassizi* varies in some respects compared with that of other species of *Gopherus* as reported by Auffenberg (1966), Weaver (1970), and Ernst and Barbour (1972).

According to my observations, courtship behavior can be divided into the following arbitrary stages.

**STAGE 1.** Courtship behavior begins with the male approaching the female. She remains indifferent or moves away, occasionally meeting the male, bobbing her head slightly as she does. If the female remains motionless, the male may touch parts of her shell and head, perhaps for sex recognition through olfactory cues. The initial approach may also include some low-intensity head bobbing by the male.

**STAGE 2.** The trailing stage occurs if the female moves away. Early trailing by the male includes low-intensity head bobbing with the neck not fully extended (Fig. 1A). The trailing stage can last a variable length of time with intensity increasing as the female increases her walking speed and moves in different directions away from the male. The male speeds up to overtake the female with an increase in intensity of head bobbing and with the neck fully extended.

**STAGE 3.** This stage begins when the male catches up with the female. He continues with high-intensity head bobbing while circling the female, usually in a counterclockwise direction (Fig. 1B). The female continues to move away and may try to avoid the male by circling around him.

Once the female stops, the intensity of male head bobbing decreases as he starts to bite the female (Fig. 1C). The female may try to avoid the male by withdrawing her front feet and head, and by turning by use of the extended hind feet. The male stays in front of the female, biting the head and legs, first one and then the other (Fig. 1D). Occasionally the carapace is bitten. The female may continue to avoid the male, but he continues to circle to keep in front of her

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while biting the legs, head, and carapace. Sometimes he rams with his mouth open, and the gular projections smash together (Fig. 1E). At the end of this stage, the female ceases to move away and is completely withdrawn into her shell.

STAGE 4. This stage begins as the male starts to mount the female. Frequently he mounts from the side with his head close to the female's head, ready to bite her (Fig. 1F). The female usually stays withdrawn into her shell. The male moves towards the posterior part of the female's carapace with short hops on his hind feet, and his front legs making scratching sounds on the female's carapace. Hissing and grunting sounds are frequently produced. Once the posterior part of the female's carapace is reached, he moves his tail forward to copulate

(Fig. 1G). The male also performs vertical pumping movements accompanied by hissing and grunting. Intromission takes place at this time if the courtship is successful.

STAGE 5. The female moves away whether the courtship is successful or unsuccessful, or the male may fall off. If he attempts to stay on the female's carapace, the male takes short hops with the hind legs while scratching the female's carapace with his front legs. Hissing and grunting sounds are still produced by the male.

When the male falls off and the female moves away, courtship can cease or begin again.

The time for each stage has not been indicated. A single stage, such as trailing, can last for a few minutes to several

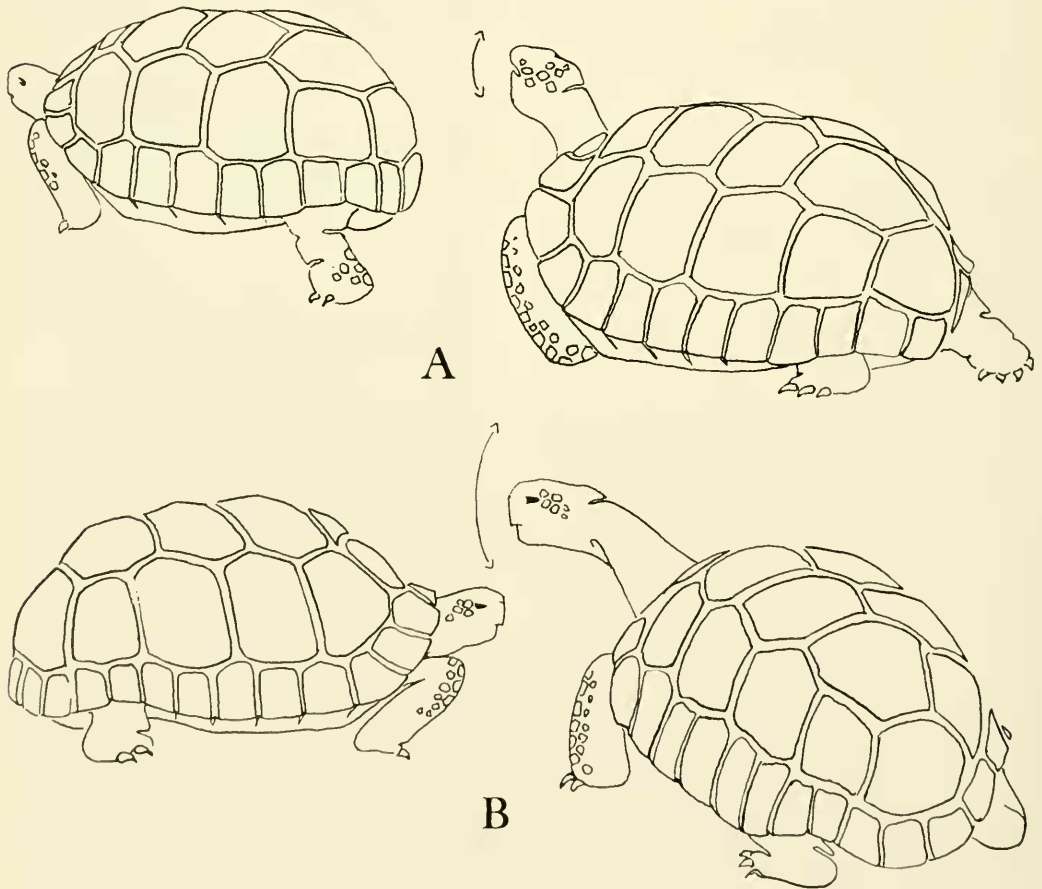
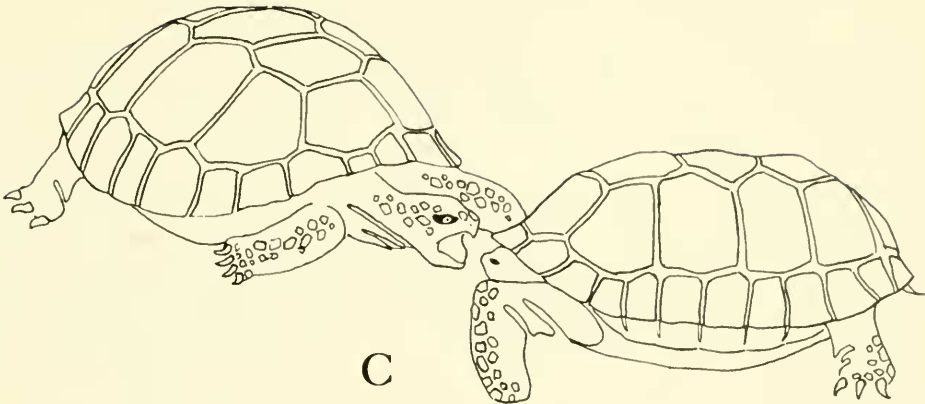
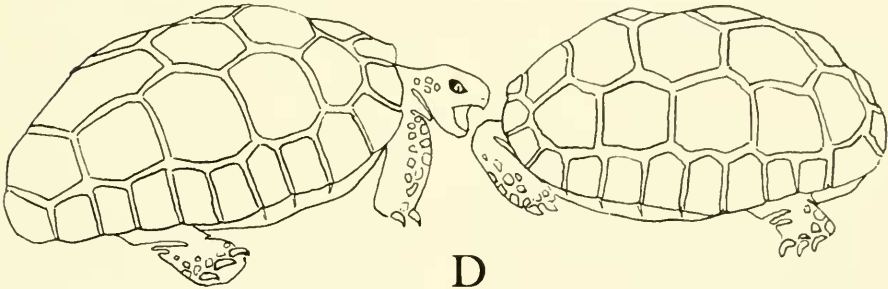


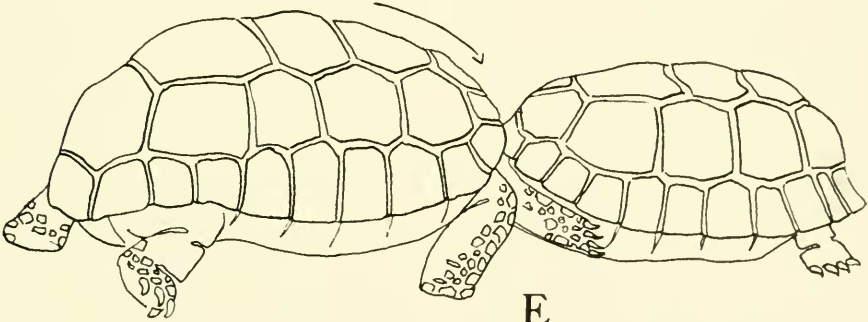
Fig. 1. Courtship behavior in *Gopherus agassizi* from Utah. A. trailing with low-intensity head bobbing; B. circling with high-intensity head bobbing; C. biting head; D. biting front leg; E. ramming; F. mounting; G. copulation.



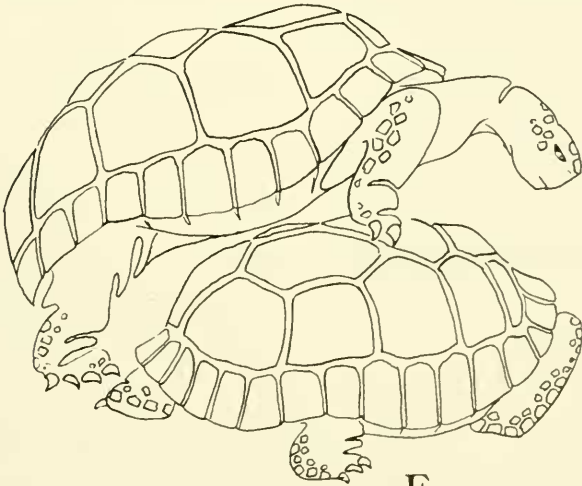
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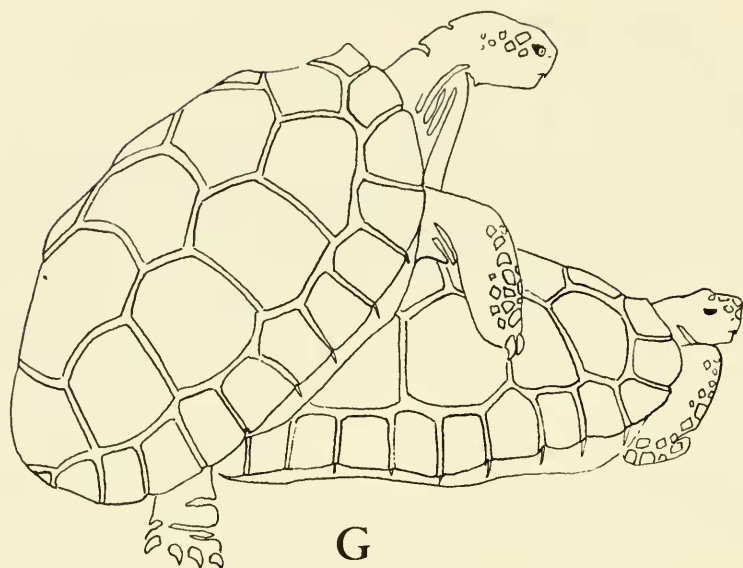
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hours, whereas the mounting stage rarely exceeds 10 minutes. Several of the complete courtships I observed exceeded one hour 20 minutes.

I found, as did Weaver (1970), that vocalization during courtship did not appear to serve as an auditory signal, but is the by-product of the long copulatory effort.

It is hoped that these observations will add additional details to our knowledge of the courtship behavior of *Gopherus agassizii*.

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